

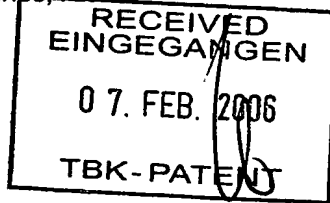
PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

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NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year)

06.02.2006

Applicant's or agent's file reference

WO 37658

IMPORTANT NOTIFICATION

International application No.
PCT/EP2003/011851

International filing date (day/month/year)
24.10.2003

Priority date (day/month/year)
24.10.2003

Applicant

HONEYWELL INTERNATIONAL INC

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:



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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WO 37658	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP2003/011851	International filing date (day/month/year) 24.10.2003	Priority date (day/month/year) 24.10.2003
International Patent Classification (IPC) or both national classification and IPC F01D9/02		
Applicant HONEYWELL INTERNATIONAL INC		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 07.03.2005	Date of completion of this report 06.02.2006
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer O'Shea, G Telephone No. +31 70 340-4424 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP2003/01 1851

J. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-10 as originally filed

Claims, Numbers

2-18 as amended (together with any statement) under Art. 19 PCT
1 received on 22.12.2005 with letter of 22.12.2005

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP2003/011851

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-18
	No: Claims	
Inventive step (IS)	Yes: Claims	1-18
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1: JP 55 037508 A (ISHIKAWAJIMA HARIMA HEAVY IND CO LTD) 15 March 1980

D2: WO 02/06637 A (ALLIEDSIGNAL TURBO SA ;DECHANET ERIC (FR); FIGURA GIORGIO (FR); JE) 24 January 2002

2.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A turbocharger (see figure) having a centre housing (9) and a thin-walled exhaust housing (2), both housings being connected to each other at cylindrical end portions (see figure) thereof by use of a floating flange ring (8) having a clamping surface which exerts at least an axial force component, wherein the turbocharger further comprises at least a counter part (the shoulders of the bolt 6) to the floating flange ring (8) having a clamping surface on the side of the end portion which forms a flange portion, opposite to the clamping surface of the floating flange ring (16), wherein said axial force component is exerted upon applying an axial load to said clamping surface by means of said counter part (by tightening the nut 7).

The subject-matter of claim 1 differs from this known turbocharger in that the end portion of the thin-walled housing is sandwiched between the floating ring and the flange portion of the centre housing.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as how to improve the joint between a thin-walled housing and the centre housing of a turbocharger.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The turbine housing-to-centre housing joint of the present application, by virtue of the sandwiching of the turbine housing between the centre housing and the

floating ring, allows the joint to be located outside the volute, contrary to the turbocharger disclosed in document D1. This means that no holes need be bored into the volute to accommodate axial fasteners. As a result, there is no risk of loosening of the fastener due to pressure fluctuations within the volute. A further advantage of the present application is that the sealing properties of the joint are improved due to the increased stiffness of the floating flange ring compared to the washers of D1, which ensures that the axial clamping load is evenly distributed over the whole circumference of the joint. Document D2 discloses the use of a V-band attachment to secure a thin-walled turbine housing to a centre housing. In the context of the present application, D2 would not be considered by the skilled person, as it does not teach a device as providing axial clamping force by means of a applying an axial load and the sandwiching arrangement of the joint is different. The skilled person is therefore not provided with teachings or hints which would prompt him to modify a turbocharger according to D1 in order to arrive at a turbocharger having the features of present claim 1.

- 2.2 Based upon the interpretation of claim 18 whereby it relates to a method of assembling a turbocharger according to any of claims 1-17, the same reasoning applies, *mutatis mutandis*. The subject-matter of such a clarified claim 18 therefore also meets the requirements of the PCT with respect to novelty and inventive step.
- 2.3 Claims 2-17 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
3. Claims 1-18 are deemed to be industrially applicable (Article 33(4) PCT).

14

Enclosure of February 24, 2005

PCT-Application No.: PCT/EP2003/11851
Applicant: HONEYWELL INTERNATIONAL INC.
Our ref.: WO 37658

5

Claims 1 to 18 amended under Article 19 PCT

10

1. A turbocharger having a center housing (1) and a thin-walled exhaust housing (13), both housings being connected to each other at cylindrical end portions (28, 27) thereof by use of a floating flange ring (16) having a clamping surface (26b) which exerts at least an axial force component for urging the end portion (28) of the thin-walled housing (13) against the end portion (27) of the center housing (1), **characterized in that**

15

the turbocharger further comprises at least a counter part (29) to the floating flange ring (16) having a clamping surface on the side of the end portion, which forms a flange portion (27), opposite to the clamping surface (26b) of the floating flange ring (16), wherein

20

said axial force component is exerted upon applying an axial load to said clamping surface (26b) by means of said counter part.

25

2. A turbocharger according to claim 1, wherein said clamping surface (26b) is slanted so as to exert a radial force component additionally to the axial force component.

30

3. A turbocharger according to claim 2, wherein said clamping surface (26b) is slanted such that said radial component is directed to the central axis of said housing portions.

35

4. A turbocharger according to any of claims 1 to 3, further comprising at least a screw (23) for applying said axial load between said counter part (29) and a boss (18) forming a part of said floating flange ring (16).

5

5. A turbocharger according to claim 4, wherein said floating flange ring (16) is provided with at least three bosses (18), each receiving one of the screws (23), the bosses (18) projecting radially from the floating flange ring (16), and at least three washers (19) form said counter part (19).

10

6. A turbocharger according to claim 5, wherein said bosses (18) receive said screws (23) in through holes and the screws (23) are tightened by means of nuts.

15

7. A turbocharger according to claim 6, wherein said bosses (18) receive said screws (23) in blind holes (19) having inner threads.

20

8. A turbocharger according to any of claims 5 to 7, wherein said bosses (18) are positioned at regular intervals.

25

9. A turbocharger according to any of the preceding claims, wherein adjacent to a tip end of the clamped end portion (28) of the thin-walled housing (13) a notch (22) is provided in the floating flange ring (16) so as to receive said tip end.

30

10. A turbocharger according to any of claims 1 to 9, wherein a single counter part (29) is provided having bores for each of the screws (23).

11. A turbocharger according to any of the preceding claims, further comprising a sealing device (24) disposed between the flange portion (27) and the end portion (28) of the thin-walled housing (13).

5

12. A turbocharger according to claim 11, wherein the sealing device (24) has a four-sided cross-section one side (26) of which is slanted to be parallel to the slanted clamping surface (26b) of the floating flange ring (16).

10

13. A turbocharger according to claim 11 or 12, wherein the sealing device (24) is in contact with flange portion the flange portion (27), an outer surface of an insert (11) being mounted to the center housing (1) and the clamped end portion (28) of the thin-walled exhaust housing (13).

15

14. A turbocharger according to any of claims 11 to 13, wherein the sealing device (24) is made from a resilient material.

20

15. A turbocharger according to any of the preceding claims 1 to 14, wherein the clamped end portion (28) of the exhaust housing (13) is slanted to be parallel to the slanted clamping surface (26b) of the floating flange ring (16).

25

16. A turbocharger according to any of preceding claims 1 to 15, wherein said flange portion (27) has a substantially rectangular cross-section.

30

17. A turbocharger according to any of preceding claims 1 to 16, wherein the side of the flange portion (27) facing the clamped end portion (28) of the thin-walled exhaust portion (13) is parallel to the latter.

35

18. A method for assembling a turbocharger, comprising a thin-walled housing (13), an inlet (13b), a center housing (1) and an insert (11), having the features of any of the claims 1 to 17, the method being characterized in the

5 following steps:

orientating and holding a center housing assembly comprising the center housing (1) and the insert (11) by means of a jig;

10 setting a thin-walled housing assembly comprising the thin-walled housing (13) and the floating flange ring (16) on the center housing assembly;

bringing the inlet (13b) in contact with a jig portion which has a fixed orientation with respect to said jig so as to set the orientation of the inlet (13b) relative to
15 the turbocharger.

Enclosure of December 22, 2005

International Patent Application No.: PCT/EP2003/11851

Applicant: HONEYWELL INTERNATIONAL INC.

Our Ref.: WO 37658

New claim 1

10

1. A turbocharger having a center housing (1) and a thin-walled exhaust housing (13), both housings being connected to each other at cylindrical end portions (28, 27) thereof by use of a floating flange ring (16) having a clamping surface (26b) which exerts at least an axial force component for urging the end portion (28) of the thin-walled housing (13) against the end portion (27) of the center housing (1), wherein

20 the turbocharger further comprises at least a counter part (29) to the floating flange ring (16) having a clamping surface on the side of the end portion, which forms a flange portion (27), opposite to the clamping surface (26b) of the floating flange ring (16), wherein

25 said axial force component is exerted upon applying an axial load to said clamping surface (26b) by means of said counter part (29),

characterized in that

30 the end portion (28) of the thin-walled housing (13) is sandwiched between the floating flange ring (16) and the flange portion (27) of the center housing (1).

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